**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| CONNECT AMERICA FUND PHASE II AUCTION | ) | AU Docket No. 17-182 |
| CONNECT AMERICA FUND | ) | WC Docket No. 10-90 |

**COMMENTS OF SPACE EXPLORATION TECHNOLOGIES CORP.**

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## I. INTRODUCTION AND SUMMARY

Space Exploration Technologies Corp. ("SpaceX") hereby comments on the Public Notice[1] regarding proposed procedures for the Connect America Fund Phase II auction ("Auction 903"). Auction 903 will allocate $1.98 billion over ten years to support broadband access in high cost and extremely high cost areas. The Commission has made clear that support should be cost effective in order to provide access in as many areas as possible. The Commission should thus encourage participation by technologies that will provide high speed, low latency broadband in the hardest areas to serve. Nongeostationary satellite orbit ("NGSO") systems, such as the system proposed by SpaceX currently under review by the Commission, hold the promise of doing so. The Commission's current proposals, however, unnecessarily conflate NGSO with traditional satellite providers and preclude them from selecting high speed and low latency tiers, impose an unnecessary requirement to provide standalone voice service, and fail to clarify how the Public Notice's list of spectrum bands might be used during the bidding process. As each of these proposals would have the effect of restricting participation in Auction 903, SpaceX respectfully requests that the Commission consider its proposals to (1) evaluate all bidders based

[1] *Connect America Fund Phase II Auction,* AU Docket No.17-182, WC Docket No 10-90, Public Notice, FCC 17-101 (rel. Aug. 4, 2017) ("Public Notice").

on the quality and level of services provided, rather than exclude technologies broadly, (2) clarify that provision of a standalone voice service is not required to bid in or receive funding from Auction 903, and (3) clarify how the Commission intends to use the spectrum chart included as Appendix B of the Public Notice.

## II. BACKGROUND

SpaceX was founded in the United States in 2002 by Chief Executive Officer and Lead Designer Elon Musk with the express goal of dramatically improving the reliability, safety, and affordability of space transportation. Today, it is the world's largest launch services provider measured by missions under contract, with over 70 missions on its manifest representing more than $10 billion in signed contracts with NASA, the Department of Defense, commercial satellite operators, and allied governments. The company has grown to over 5,000 employees in headquarters, launch, and development facilities throughout the United States.

SpaceX designs, manufactures, and operates highly sophisticated space systems. The Falcon 9 launch vehicle has successfully flown 40 times since 2010, and its future manifest represents the majority of global commercial satellite launches. Falcon 9 is the world's only reusable launch vehicle system, and the first stage of the Falcon 9 has safely landed 16 times following operational launches to space. Within the next few months, SpaceX plans to debut the Falcon Heavy, which will be the world's most powerful active launch system. Additionally, SpaceX developed the Dragon spacecraft, which conducts routine missions to the International Space Station in uncrewed and, soon, crewed configurations.

The proven capability to design complex spacecraft and deploy them routinely into orbit is critical as SpaceX now prepares to deploy a global satellite constellation. Having revolutionized space transport, SpaceX intends to use its launch capacity and manufacturing

efficiency to create, deploy and operate a satellite network capable of providing high speed, low latency broadband anywhere on the planet. In November 2016 and March 2017, SpaceX submitted applications to the Commission for approval of orbital deployment and station licenses for a constellation of 4,425 Ka/Ku-band NGSO satellites operating at altitudes of 1,110-1,325 km and a separate constellation of 7,518 V-band NGSO satellites operating at altitudes of 335-345 km. When deployed, these constellations will be capable of delivering broadband speeds directly to individual users anywhere in the United States or around the world at fiber-like speeds. These NGSO systems will operate far closer to the Earth than typical geostationary orbit ("GSO") satellites, which operate at 35,786 km, dramatically reducing the latency experienced by satellite customers to 25 to 35 milliseconds[2] – latency that is comparable to 5G.

## III. NARROWLY LIMIT TECHNOLOGY-BASED TIER PRECLUSION

The Public Notice solicits comments regarding procedures for Auction 903, which will distribute $1.98 billion in high cost funding over ten years with the goal of supporting broadband in high cost and extremely high cost areas where price cap carriers declined model-based support. Earlier in the proceeding, the Commission adopted rules providing different bidding weights to different tiers of speed, usage, and latency applicants might select.[3] Now, the Public Notice proposes to preclude "satellite providers" from selecting low latency for any tier, or selecting speeds of 1 Gbps downstream/500 Mbps upstream combined with a monthly usage allowance of 2 TB.[4]

SpaceX does not object to the adoption of tiers or weighting based on speed, usage, or

[2] *See* Kota, S. & Pahlavan, K., *Broadband Satellite Communication for Internet Access* §§ 2.3.3, 2.3.4 (2011).
[3] *See Connect America Fund et al.,* Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 5949, 5956-63 (2016); *Connect America Fund et al.,* Report and Order and Order on Reconsideration, 32 FCC Rcd 1624, 1651 (2017) (*Phase II Auction FNPRM Order*) (reconsideration of monthly usage allowances for Above Baseline and Gigabit tiers).
[4] Public Notice, paras. 49-51.

latency as set forth in previous orders, or the Commission's proposals to implement these rules as set forth in the Public Notice. However, the Public Notice's proposal to preclude "certain technologies" from selecting low latency or certain tiers is far too broad. The Public Notice defines the "certain technologies" it intends to preclude as technologies used by "satellite providers," but justifies this preclusion by citing only the insufficient speeds and latencies offered by GSO satellite systems. To underscore the obvious, NGSO and GSO systems are substantially different, and their performance capabilities on the key criteria identified in the Public Notice diverge significantly: NGSO systems will provide faster broadband at latencies that meet the Commission's definition of "low latency."

The Public Notice's conflation of NGSO and GSO systems generically as "satellite technologies" represents a misunderstanding of the different capabilities of different types of satellite systems and is entirely inconsistent with the Commission's separate proceedings on NGSO systems. In those proceedings, the Commission is undertaking a laudatory effort to establish a regulatory framework to *encourage* the development and deployment of NGSO systems – systems that the Commission has already recognized are poised to provide broadband speeds at low latencies everywhere in the United States. Indeed, Chairman Pai recently said that NGSO technology's "use case is particularly compelling in remote and hard-to-serve areas," and Commissioner O'Rielly said that NGSO systems "will facilitate high-speed broadband connectivity to the hardest to reach portions of our country, enabling the offering of service to the unserved."[5] The Commission should reject the Public Notice's overly broad proposal to exclude all "satellite technologies," and correct the false presumption that all satellite technologies are now and forever unsuitable for consumer broadband, and therefore ineligible for

[5] *WorldVu Satellites Ltd.,* Order and Declaratory Ruling, IBFS File No. SAT-LOI-20160428-00041, Call Sign S2963, FCC 17-77 (rel. Jun. 23, 2017), Statements of Chairman Ajit Pai and Commissioner Michael O'Rielly.

high cost support in areas where NGSO systems are uniquely designed to serve customers competitively and cost-effectively. Conflating NGSO systems and GSO systems would be the same as the Commission prohibiting fiber systems from bidding because dial-up is not fast enough: just because both systems are hard wired does not mean that they are equivalent.

Broad technology-based preclusion is particularly inappropriate given the whole point of the high cost rules is "to ensure that robust, affordable voice and broadband service, both fixed and mobile, are available to Americans throughout the nation."[6] If the Commission wants all Americans to have cost-effective, high-speed broadband, and it intends to provide support for as long as ten years with one auction, then its rules must encourage – or at least not preclude – participation by new entrants using new, transformative models and technologies. As Chairman Pai has said, "auction weights [were] designed to give every bidder—no matter what technology they use—a meaningful opportunity to compete for federal funds, while ensuring the best value for the American taxpayer."[7] SpaceX believes auction weights can drive supported services to high quality speeds and latencies, but the Commission should not then exclude broad swaths of applicants from bidding for service tiers based on evidence of only one type of service.

The Public Notice does state that "it may not serve the public interest to award Phase II support for such a technology at this time based on possible future technological advances,"[8] and SpaceX agrees. Given that the Commission is determining the rules that will provide high cost support for the next ten years, however, it would be shortsighted and inaccurate to use evidence about geostationary satellite systems to exclude NGSO systems, precisely at a point when the FCC is in the midst of creating a regulatory framework for them.

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[6] *USF/ICC Transformation Order* at 17667.
[7] *Phase II Auction FNPRM Order*, Statement of Chairman Ajit Pai.
[8] Public Notice, para. 50.

Crucially, NGSO satellite constellations and their broadband service offerings are not some distant prospect. They are being developed and constructed, and they are rapidly approaching operation within the timeframe contemplated by Auction 903. The Commission has already approved one lead applicant for U.S. access, Commission staff are processing 10 other applications, and the Commission is now reviewing updates to the relevant rules under Parts 5 and 25 pursuant to the NGSO Notice of Proposed Rulemaking.[9] It is likely that when Auction 903 begins, one or more of these NGSO systems will be operational or closing in on deployment. It would run directly counter to the objectives of Auction 903 if NGSO operators were excluded from bidding for low latency, high performance tiers due to a miscategorization of the technology involved. Such a result would constitute a singular and avoidable regulatory failure resulting in higher costs and less broadband for American consumers.

Should the Commission want to streamline application review, it must limit preclusion to the service for which it actually has evidence. By doing so, the Commission will demonstrate a clear commitment to results-based regulation, with a CAF II auction that supports broadband in the areas that need it in the most cost effective, administratively efficient way. Moreover, the Commission will achieve this goal while ensuring that every bidder – no matter what technology it might use – has a meaningful opportunity to participate.

## IV. CLARIFY THAT THE STANDALONE VOICE REQUIREMENT DOES NOT APPLY

The Public Notice seeks comment on application and eligibility processes for participating in Auction 903 and receiving support. The Public Notice does not suggest any change to the basic eligibility requirement that recipients of high cost support provide a

[9] *See WorldVu Satellites Ltd.; Report No. SPB-271,* Applications Accepted for Filing, Satellite Pol. Br., DA 17-524 (rel. May 26, 2017); *Update to Parts 2 & 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems & Related Matters,* Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016).

standalone voice service.[10] SpaceX notes that AT&T, USTA, and Southern Tier Wireless have also asked for removal of the standalone voice requirement,[11] and likewise urges the Commission to take this opportunity to clarify that recipients of support through Auction 903 will no longer need to provide a separate, standalone voice service in addition to whatever other broadband services they may provide.

Any new operator deploying infrastructure will deploy an all-IP network over which voice will ride as an application, and would not normally invest in voice-specific hardware. This approach ensures that consumers using these IP-based services enjoy the voice capability at a far lower price. Requiring a standalone voice service mandates business actions that IP-based providers would not otherwise take in the absence of the requirement: deploying voice-specific hardware in their networks and possibly segregating capacity; developing and making available voice equipment; and providing voice-specific customer support and tailored consumer offerings. All of these steps make it more difficult for new entrants to compete for high cost support, without adding new functionality for the consumer. If the standalone voice requirement resulted in significant public benefit, then its cost in terms of decreased competition and increased cost might be justifiable. But few, if any, consumers actually opt for standalone voice service when presented with just this scenario.[12] The standalone voice requirement thus imposes a significant regulatory burden on new entrants seeking high cost support for broadband services

[10] *See* 47 C.F.R. §54.101; *Connect America Fund et al.,* Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17693 (2011) (*USF/ICC Transformation Order*); *Connect America Fund et al.*, Report and Order, 28 FCC Rcd 15060, 15062 n.12 (2013); *Connect America Fund et al.*, Order, 32 FCC Rcd 968, 986 (2017).

[11] *See* Letter from Mary L. Henze, Asst. Vice Pres., Fed. Regulatory, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, WC Docket No. 11-42 (filed Oct. 14, 2014) ("AT&T Ex Parte"); Letter from Jonathan Banks, Sr. Vice Pres., Law & Policy, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, WC Docket No. 05-337 (filed Mar. 14, 2014), Att. at 2-3; Request for Clarification or Partial Reconsideration, Southern Tier Wireless, Inc., Connect America Fund et al., WC Docket Nos. 10-90, 14-58 & 14-259 (filed Jul. 20, 2016).

[12] *See* AT&T Ex Parte at 1-2.

that is supported neither by consumer demand nor by enhanced consumer functionality. In effect, it discriminates against modern technologies while prioritizing previous generation networks, to the detriment of the consumer.

To be sure, the Communications Act and the Commission's orders define voice telephony as the supported service while offering broadband is considered a condition of receiving support, and SpaceX does not object to the requirement that customers have access to voice telephony.[13] Voice telephony meeting the Commission's requirements is provided today over many IP networks, and NGSO satellite systems will be similarly capable of providing voice services at the same quality as is currently provided by terrestrial wireless systems, without any noticeable lag due to latency. Ensuring that voice telephony is available over a broadband service, however, does not require the offering of an entirely separate standalone voice service to customers, and nothing in the logic of the Commission's orders mandates such a requirement. The Commission's entire approach to universal service since 2011 has been driven by the gradual evolution of technology, and that gradual evolution has resulted in voice service functioning as an application that rides over broadband IP networks. The Commission's requirements should reflect that reality, especially when it is deciding to provide high cost support for a span of as long as ten years into the future.

The Commission's approach to universal service reflects these developments, as requirements for standalone voice and support for voice services have gradually rolled back in favor of providing funds for broadband networks. This is an approach already advocated by different operators, and one that over 100 Member of Congress asked the Commission to pursue

[13] *See* 47 U.S.C. §254; *USF/ICC Transformation Order,* paras. 77-83, 86, *aff'd sub nom.,* In re: FCC 11-161, 753 F.3d 1015 (10th Cir. 2014).

in order to make it easier to expand broadband in rural areas.[14] The Commission has already granted broad forbearance to price cap carriers from the requirement to offer voice telephony throughout their service areas,[15] and support for voice services is already being phased out entirely for the E-rate and Lifeline programs.[16] The Commission rejected arguments that voice only service should be supported in the Lifeline program by stating that "we are not persuaded that such service will no longer be available or affordable if it is part of a bundle with broadband services,"[17] reasoning that applies equally in this case of high cost support. In light of these gradual developments, eliminating the standalone voice requirement for Auction 903 is the next logical step in providing support for the networks of today and tomorrow and contributing to meaningful broadband expansion in the United States.

SpaceX thus proposes that the Commission take this opportunity to clarify that recipients of CAF II support for broadband need not offer a standalone voice service and can instead comply with the rules by ensuring that IP-based voice applications meeting the Commission's requirements are made available to consumers over any broadband service they do provide.

## V. CLARIFY USE OF APPENDIX B

The Public Notice includes a spectrum chart listing bands the Commission anticipates "could be used for the last mile," and solicits comment as to whether these bands would provide sufficient bandwidth to meet Phase II service obligations.[18] The Public Notice did not, however, propose how the Commission plans to use this chart. Is it meant to provide non-mandatory

[14] *See, e.g., infra* n.11; *see* Letter from Rep. Kevin Cramer *et al.* to Thomas Wheeler, Chairman, FCC (dated May 12, 2015) (criticizing tying broadband support to voice service).
[15] *See Connect America Fund et al.*, Report and Order, 29 FCC Rcd 15644, 15663-71 (2014).
[16] *See Modernizing the E-Rate Program for Schools and Libraries,* Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 8870, 8922-28 (2014); *Lifeline and Link Up Reform and Modernization et al.*, Third Report and Order, Further Report and Order and Order on Reconsideration, 31 FCC Rcd 3962, 3981-87 (2016) ("*Lifeline Modernization Order"*).
[17] *Lifeline Modernization Order* at 3984.
[18] Public Notice, para. 40 & App. B.

guidance to applicants? Is it meant to provide an exclusive list of bands that applicants are restricted to using? The Public Notice does not say.

The Commission already proposes to require extensive information from applicants in their short-form applications regarding the spectrum they intend to use and a demonstration that applicants have "sufficient spectrum resources to cover peak network usage and meet the minimum performance requirements to serve the fixed locations in eligible areas."[19] Because applicants will provide ample information to enable the Commission to judge whether an applicant is capable of meeting its service requirements, it would be unnecessarily restrictive for the Commission to further require that any spectrum used fit into its schedule of bands. The slight benefit of such a requirement in administrative efficiency would be far exceeded by the short-term cost of the time required to ensure the list is not arbitrarily restrictive, and the longer-term potential cost of excluding otherwise qualified bidders because their spectrum might not match exactly the chart's spectrum scheme.

Thus, the Commission should clarify that the spectrum chart in Appendix B will only be used as a non-mandatory guide for spectrum that could be used by applicants, but not an exclusive list. If the Commission instead decides that the spectrum chart will have some impact or effect on eligibility to bid in Auction 903, the Commission must include the frequencies it is currently examining in the proceedings reviewing NGSO satellite system applications, and add any expansion of the bands decided in those proceedings.[20]

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[19] Public Notice, para. 38.

[20] For SpaceX, in addition to the Ku and Ka-bands already listed on the chart (14-14.5 GHz, 11.7-12.2 GHz, 17.7-20 GHz and 27.5-30 GHz), this would require inclusion of the following bands that would be used for connectivity to end users: 10.7-12.7 GHz (Ku-band downlink, inclusive of existing 11.7-12.2 GHz), 12.75-13.25 GHz (Ku-band downlink), 19.7-20.2 GHz (Ka-band downlink, inclusive of existing 19.7-20 GHz), 37.5-40 GHz (V-band downlink), 40-42.5 GHz (V-band downlink), 47.2-50.2 GHz (V-band uplink) and 50.4-52.4 GHz (V-band uplink). SpaceX incorporates by reference the information submitted in its NGSO satellite system applications as support for the use of these frequencies in providing broadband connectivity to individual end users. *See* Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System, SAT-LOA-

## VI. CONCLUSION

For the foregoing reasons, the Commission must (1) evaluate all bidders based on the quality and level of services provided, rather than exclude technologies broadly, (2) clarify that provision of a standalone voice service is not required to bid in or receive funding from Auction 903, and (3) clarify how it intends to use the spectrum chart included as Appendix B of the Public Notice. By taking these actions, the Commission can avoid inadvertently excluding new technologies from Auction 903 – technologies that are uniquely suited to provide cost effective, nationwide broadband service in the hardest to reach areas.

Respectfully submitted,

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20161115-00118 (filed Nov. 15, 2016); Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System, SAT-LOA-20170301-00027 (filed Mar. 1, 2017).